Remarks/Arguments

The telephone interviews granted by Ms. Dye and Ms. Grey on or about 6/01/2006, 6/07/2006 and 6/11/2006 were most appreciated. While the interviews failed to produce positive or definitive results, informal claims were newly drafted and were put before the examiner for review and discussion. The claims failed to receive positive results and no additional limitations were proposed by the examiner.

The informal claims are here formally presented with additional arguments in hopes of receiving a positive review.

It is noted that the prosecution of this application does not classify as compact prosecution, there having been six actions now of record and the application is not under final action. It is urged that prosecution before the examiner be closed or made final in consideration of this response.

The instant invention is to provide a synthetic yarn formed primarily of polymeric material, preferbly polyester monofilaments, which are non-conductive. Forming a multi-component yarn using this material as a first component and a very small amount of carbon nanotubes in concentrations of between .5% and 20% in combination with the polymeric material as the second component. The small proportion of carbon nanotubes produce good conductivity with surprisingly low electrical resistance. Because the percentage of carbon nanotubes utilized with the second component is very small with an even smaller percentage utilized for the combined multi-component yarn, the yarn maintains surprisingly good elastic, flexibility and strength characteristics.

The secondary component is combined with the primary component, preferably in melt form. The primary component is not stretched during application but may be set

prior to being combined with the secondary component.

Turning now to the applied references, DeAngelis, et al '421, Patel, et al '572 and Shibuta '280.

The reference to DeAngelis, et al is directed to a temperature dependent multi-component electrically sensitive yarn. The primary component or core 100 is non-conductive and may be formed of polymeric materials.

The secondary component generally comprises sheath 200 which is formed about core 100. Sheath 200 includes electrical conductors 210 which are blended with a thermal expansive low conductive matrix 220. An insulator 300 surrounds sheath 200.

The conductors 200 may comprise carbon graphite. The matrix 220 must have a higher co-efficient of expansion than conductive particles 210. This material must expand with increased temperature thereby separating the conductive particles which increases electrical resistance. (See column 2.)

The invention has as its object to decrease or limit current draw to control heat generation.

The patent to DeAngelis, et al is not concerned with nor does it disclose ratios of the conductive component relative to non-conductive sheath component nor the total non-conductive components of the multi-component yarn.

The reference does not disclose the use of carbon nanotubes.

The reference does not disclose heat setting the core non-conductive component while not heat setting the cover or conductive component.

The reference is not concerned with providing a resilient conductive yarn but

rather is directed to a yarn which provides increasing or variable resistance electrical conductive features.

The reference does not teach producing a multiple component yarn in which the non-conductive polymeric material is the same material in each component. Specific materials such as polyethylene, polyolefins, etc., are only disclosed as being possibly suitable for use with matrix 220. (See column 2, lines 23-36.)

Turning now to the secondary reference to Patel, et al, which is applied to teach the use of carbon nanotubes in the amount of .025 wt % in electrically conductive compositions.

Patel, et al does not disclose a multi-component yarn or structure. The reference is limited to a resin composition which is conductive. The reference does not disclose the use of this composition as one of two components forming a multi-component yarn. The reference does not teach combining nano-carbon with only one component of a multi-component yarn in specific quantities with respect to the combination component and with both components.

The reference to Shibuta is similar to the Patel, et al reference as it discloses only a single component or composition which may include carbon nanotubes in specific accounts relative to the composition. The reference does not disclose a multi-component unit with one component comprising only polymeric material and the other component polymeric material in combination with carbon nanotubes. Specific volumes of the carbon nanotubes in combination with the combination component and the total structure to include both components are not made.

Neither secondary reference provides a teaching that it would be desirable to

utilize the disclosed electrically conductive component as one component of a multi-component yarn and that the non-conductive component of the multi-component yarn comprises the non-conductive component of electrically conductive component. The primary reference provides no teaching that carbon nanotubes used in a single composition should be extracted for use with one component of a multi-component yarn.

This being so, no teaching exists to provide the percentage conductive material for the multi-component yarn and the percentage conductive material for the conductive component.

Turning now to claim 24, the claim calls for a multi-component yarn having a primary component composed of at least one filament set to have defined elongation properties and comprised of a single polymeric material. The claim also calls for a second component formed solely of said single polymeric material unset or not having reduced elongation properties combined with carbon nanotubes, the second combination component being bonded with the set elongated filament along its length.

No reference teaches this structure. The reference to DeAngelis, et al does not teach setting the material forming one component and not setting the one material forming the second component of the multi-component yarn thereby providing different elongation characteristics for the two components.

The secondary references do not teach a multi-component yarn, merely a composition.

The claim further calls for the carbon nanotubes to comprise between .5% and 5% of the mass of the secondary component and between .5% and 15% of the mass of

the multi-component yarn.

The primary reference teaches 50% carbon in the multi-component matrix and makes no reference of carbon relative the combined multi-component yarn.

The secondary references are to single compositions, and therefore, can support no percentage for the multi-component composition. They also are not directed to yarns.

To combine the disclosures of the secondary references or portions thereof with that of the primary reference is improper. There is no motivation for such a combination. There is absolutely no motivation to utilize carbon nanotubes disclosed in single compositions as one of the compositions of a filament forming one component of a multi-component yarn.

The claims as here presented are clearly supported by the disclosure as originally presented. (See paragraphs 22 and 44.)

Claims 2 and 25 depend from claim 24 and are believed allowable for the reasons above set forth.

Claim 26 is similar to claim 24 calling for an electrically conductive multi-component yarn having a primary and a secondary component. The claim calls for a first component to consist of at least one elongated filament formed of a single polymeric material and the second component to consist of at least one elongated filament of the same polymeric material blended with carbon nanotubes. The claim further calls for elongated filament of the second component to be bonded along its length with the filament of the first component.

No reference teaches this structure. The primary reference teaches a multi-

component yarn. It does not teach one component comprising a filament formed of a single polymeric material and a second component comprising a second filament formed of the same polymeric material blended with carbon nanotubes. Finally, it does not teach bonding the first and second filaments along their length. The primary reference is restricted to coating or encapsulating the first filament.

The secondary references are directed to compositions and provide no additional teaching.

The claim further calls for the carbon nanotubes to comprise between .5% and 15% of the mass of the multi-component yarn and between 2% and 5% of the mass of the secondary component.

For the reasons earlier stated, the references do not anticipate this limitation.

It is noted that claim 26 includes the limitations of original claim 5 indicated in the action of 10/07/2005, as directed to allowable subject matter. The rejection of 4/05/2006 does not indicate why claim 5 written in independent form is not allowable. Clarification is requested.

Favorable consideration is respectfully requested.

Respectfully submitted,

Henry S. Jaudon
Registration No. 34,056
McNair Law Firm, P.A.
P.O. Box 10827
Greenville, SC 29603-0827
Telephone: (864) 232-4261
Agent for the Applicant